

## DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below adjacent to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of subject matter (process, machine, manufacture, or composition of matter, or an improvement thereof) which is claimed and for which a patent is sought by way of the application entitled:

### EFFICIENT HANDLING OF A LARGE REGISTER FILE FOR CONTEXT SWITCHING

which (check) ☒ is attached hereto.

☐ and is amended by the Preliminary Amendment attached hereto.

☐ was filed on \_\_\_\_\_ as Application Serial No. \_\_\_\_\_.

☐ and was amended on \_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
Number	Country	Day/Month/Year Filed	Yes	No
N/A			<input type="checkbox"/>	<input type="checkbox"/>

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Provisional Application Number	Filing Date
N/A	

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information, which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56, which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

Application Serial No.	Filing Date	Status (patented, pending, abandoned)
N/A		

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith:

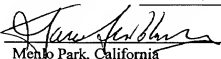
Alan H. MacPherson (24,423); Thomas S. MacDonald (17,774); Kenneth E. Leeds (30,566); Brian D. Ogonowsky (31,988); David W. Heid (25,875); Norman R. Klivans (33,003); Edward C. Kwok (33,938); David E. Steuber (25,557); Michael Shenker (34,250); Stephen A. Terrile (32,946); Peter H. Kang (40,350); Ronald J. Meetin (29,089); Ken John Koestner (33,004); Omkar K. Suryadevara (36,320); David T. Millers (37,396); Kent B. Chambers (38,839); Serge J. Hodgson (40,017); Michael P. Adams (34,763); Bernard Berman (37,279); Michael J. Halbert (40,633); Gary J. Edwards (41,008); William B. Tiffany (41,347); James E. Parsons (34,691); Daniel P. Stewart (41,332); Philip W. Woo (39,880); John T. Winburn (26,822); Tom Chen (42,406); Fabio E. Marino (43,339); William W. Holloway (26,182); Elaine H. Lo (41,158); Don C. Lawrence (31,975); Marc R. Ascolese (42,268); Carmen C. Cook (42,433); David G. Dolezal (41,711); Adrian J. Lee (42,785); Michael P. Noonan (42,038); Roberta P. Saxon (43,087); Bernice Chen (42,403); Mary Jo Bertani (42,321); Dale R. Cook (42,434); Kenneth Olsen (26,493); Matthew C. Rainey (32,291); Timothy J. Crean (37,116); Philip J. McKay (38,966); Robert S. Hauser (37,847); Patrick J.S. Inouye (40,297); Joseph T. FitzGerald (33,881); and Alexander E. Silverman (37,940).

Please address all correspondence and telephone calls to:

Ken J. Koestner  
Attorney for Applicant(s)  
**SKJERVEN, MORRILL, MacPHERSON, FRANKLIN & FRIEL LLP**  
25 Metro Drive, Suite 700  
San Jose, California 95110-1349  
  
Telephone: 408-453-9200  
Facsimile: 408-453-7979

I declare that all statements made herein of my own knowledge are true, all statements made herein on information and belief are believed to be true, and all statements made herein are made with the knowledge that whoever, in any matter within the jurisdiction of the Patent and Trademark Office, knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be subject to the penalties including fine or imprisonment or both as set forth under 18 U.S.C. 1001, and that violations of this paragraph may jeopardize the validity of the application or this document, or the validity or enforceability of any patent, trademark registration, or certificate resulting therefrom.

Full name of sole (or first joint) inventor: Tremblay, Marc

Inventor's Signature: 

Date: 11/30/98

Residence: Menlo Park, California

Post Office Address: 140 Hanna Way  
Menlo Park, California 94025

Citizenship: Canada

Full name of sole (or first joint) inventor: Joy, William

Inventor's Signature: \_\_\_\_\_

*Will. M. Joy*

Date: \_\_\_\_\_

*December 2, 1998*

Residence: \_\_\_\_\_

*ASPE, Colorado*

Post Office Address: \_\_\_\_\_

*P.O. Box 23*

Citizenship: \_\_\_\_\_

*USA*

*ASPE, Colorado 81612-0023*

# ASSIGNMENT

For good and valuable consideration, receipt of which is hereby acknowledged, we

<u>Tremblay, Marc;</u>	of	<u>Menlo Park, California</u>
<u>Joy, William</u>	of	<u>ASPD, 20002490 1/2/93 my</u>

hereby sell, assign and transfer to Sun Microsystems, Inc., a Delaware corporation, having a place of business at 901 San Antonio Road, M/S PAL01-521, Palo Alto, CA 94303, its successors and assigns, the entire right, title and interest throughout the world in our invention in

## EFFICIENT HANDLING OF A LARGE REGISTER FILE FOR CONTEXT SWITCHING

for which we have executed a United States patent application on or about the date of this assignment, and all patent applications and patents of every country for said invention, including divisions, reissues, continuations and extensions thereof, and all rights of priority resulting from the filing of said applications; we authorize the above-named assignee to apply for patents of foreign countries for said invention, and to claim all rights of priority without further authorization from us; we agree to execute all papers useful in connection with said United States and foreign applications, and generally to do everything possible to aid said assignee, their successors, assigns and nominees, at their request and expense, in obtaining and enforcing patents for said invention in all countries; and we request the Commissioner of Patents and Trademarks to issue all patents granted for said invention to the above-named assignee, its successors and assigns.

Executed this 30<sup>th</sup> day of November, 1998

  
 \_\_\_\_\_  
 Marc Tremblay

Executed this 2<sup>d</sup> day of December, 1998

  
 \_\_\_\_\_  
 William N. Joy

# ASSIGNMENT

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<u>Joy, William</u>	of	<u>Aspen, Colorado 4/2/95 (my)</u>

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 \_\_\_\_\_  
 William Joy



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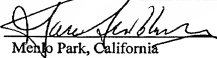
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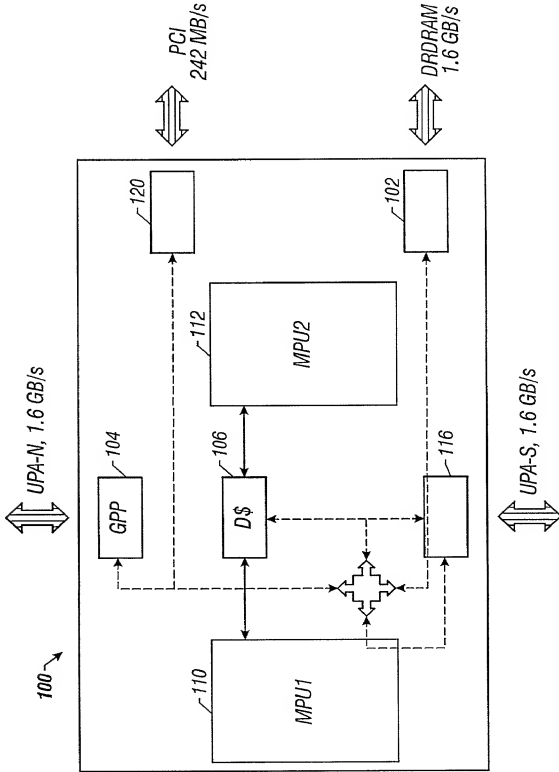


FIG. 1

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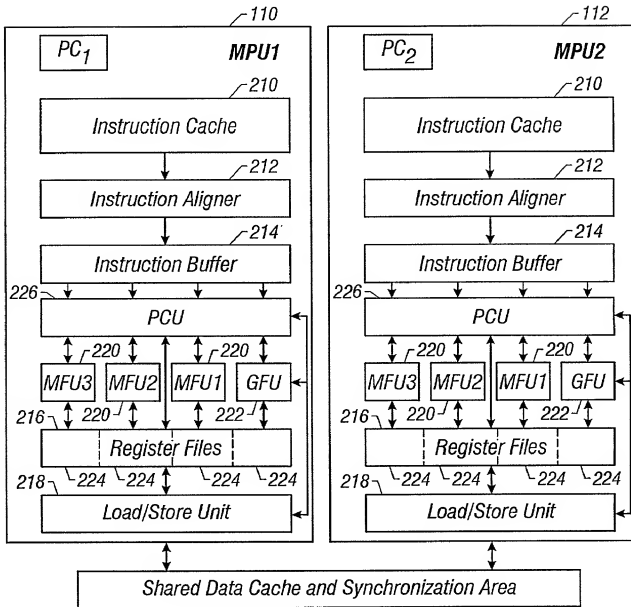
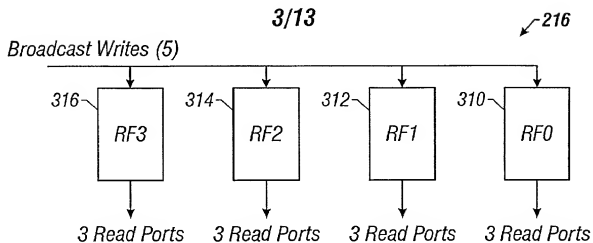
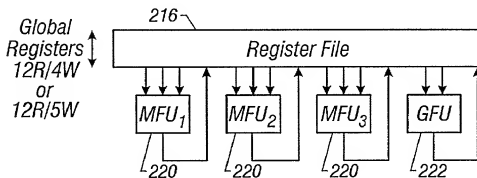


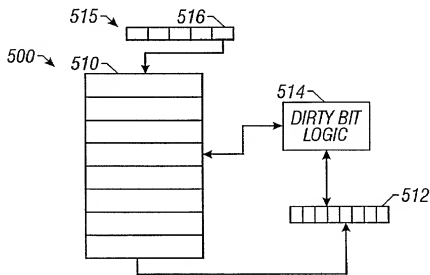
FIG. 2



**FIG. 3**



**FIG. 4**



**FIG. 5**

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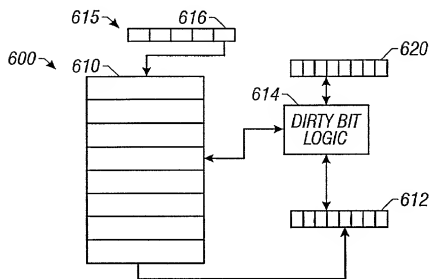


FIG. 6

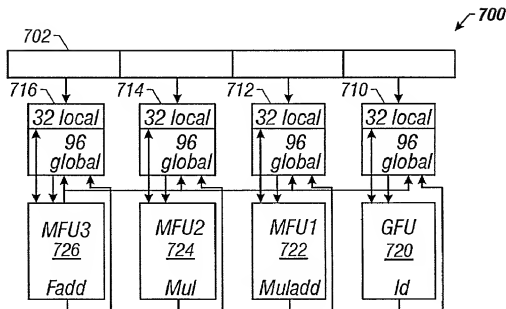


FIG. 7

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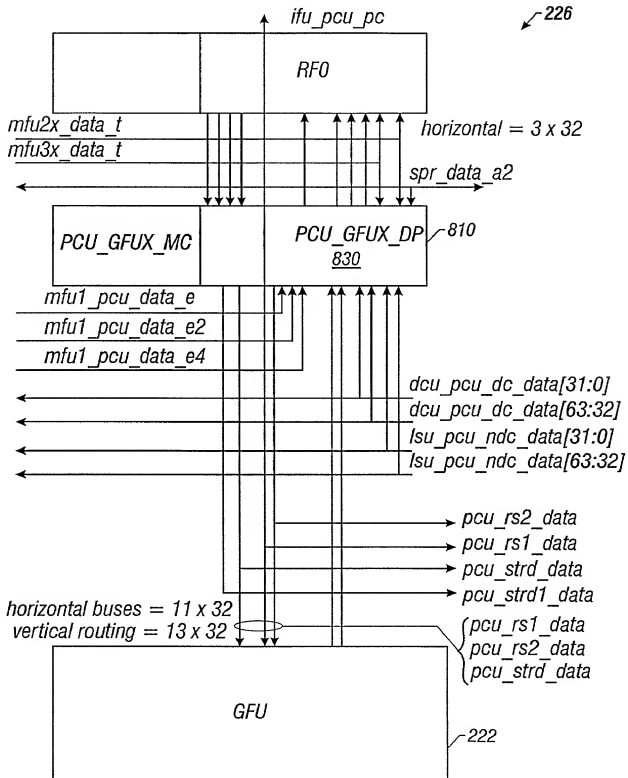


FIG. 8A

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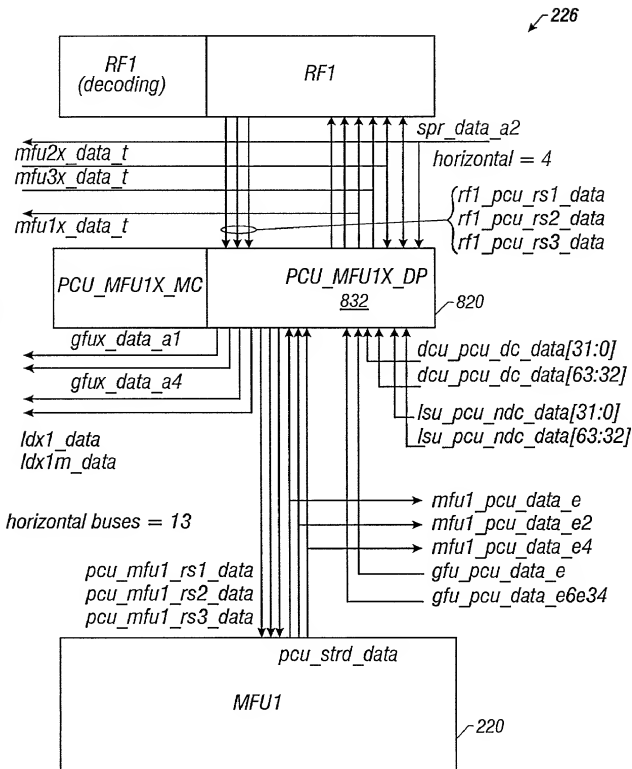


FIG. 8B

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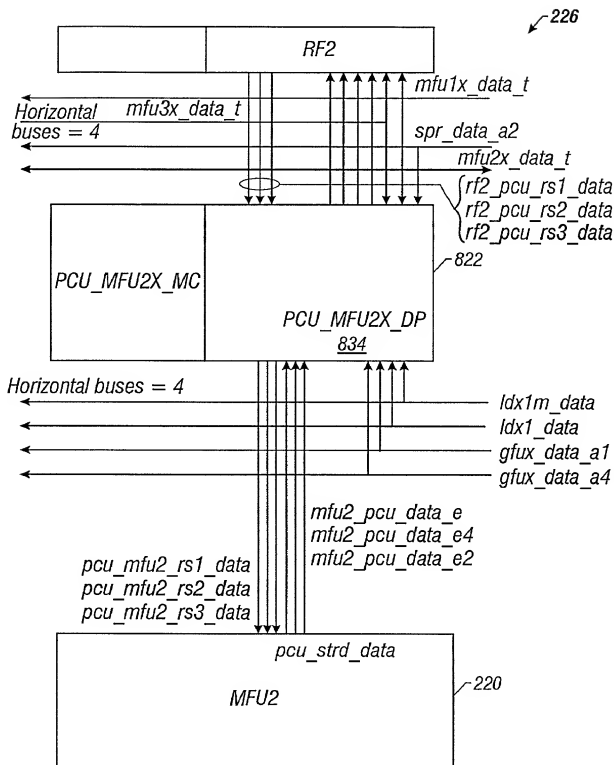


FIG. 8C

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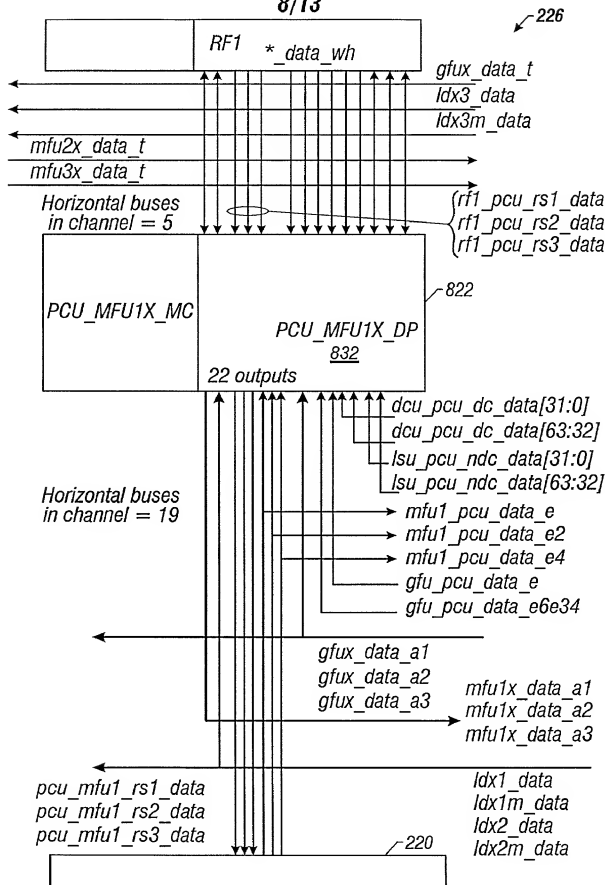


FIG. 8D



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<i>Register name</i>	<i>width</i>	<i>address specifier</i>	<i>user access</i>	<i>supervisor access</i>	<i>thread state</i>
<i>PSR</i>	8	<i>010_0001</i>	<i>no</i>	<i>rd/wr</i>	<i>yes</i>
<i>TPSR1</i>	8	<i>010_0010</i>	<i>no</i>	<i>~</i>	<i>yes</i>
<i>TPSR2</i>	8	<i>010_0011</i>	<i>no</i>	<i>~</i>	<i>yes</i>
<i>PCR</i>	7	<i>010_0000</i>	<i>no</i>	<i>~</i>	<i>no</i>
<i>TL</i>	2	<i>010_0100</i>	<i>no</i>	<i>~</i>	<i>no</i>
<i>TICK</i>	32	<i>010_0101</i>	<i>read only</i>	<i>~</i>	<i>no</i>
<i>TVALUE</i>	32	<i>010_0110</i>	<i>no</i>	<i>~</i>	<i>no</i>
<i>TCNTL</i>	8	<i>010_0111</i>	<i>no</i>	<i>~</i>	<i>no</i>
<i>GX</i>	13	<i>001_0000</i>	<i>no</i>	<i>rd only</i>	<i>yes</i>
<i>INT</i>	7	<i>010_1000</i>	<i>no</i>	<i>rd/wr</i>	<i>yes</i>
<i>FSR</i>	16	<i>001_0001</i>	<i>rd/wr</i>	<i>~</i>	<i>yes</i>
<i>FMT</i>	2	<i>010_1010</i>	<i>rd/wr</i>	<i>rd/wr</i>	<i>yes</i>
<i>DIRTY</i>	6	<i>010_1011</i>	<i>rd/wr</i>	<i>~</i>	<i>yes</i>
<i>INT_OTHER</i>	—	<i>010_1001</i>	<i>no</i>	<i>wr only</i>	<i>yes</i>

FIG. 9

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<i>PCR</i>	<i>PCR</i>	<i>Description</i>	<i>Initial value</i>	<i>After a trap</i>
[0]	POW	power management	0 (off)	N/C not changed
[1]	ICE	icache enable	0	"
[2]	DCE	dcache enable	0	"
[3]	BPTE	branch predict taken enable	0	"
[4]	PE	pipeline enable	0	"
[5]	MSTEP	memory step	0	"
[6]	PID	processor ID	hardwired	hardwired

**FIG. 10**

<i>Instruction</i>	<i>Instruction</i>
<i>vliw_1</i>	<i>setir ra, PSR</i>
<i>vliw_2</i>	<i>ld_2 [r1+r2], r3</i>
<i>vliw_3</i>	<i>ld_3</i>
<i>vliw_4</i>	<i>ld_4</i>
<i>vliw_5</i>	<i>ld_5</i>
<i>vliw_6</i>	<i>ld_6</i>

**FIG. 11A**

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<i>cycle</i>	1	2	3	4	5	6	7	8	9	10	11	12
<i>setir</i>	D	E	A1	A2	A3	T	WB					
<i>ld_2</i>		D	E	A1	A2	A3	T	WB				
<i>ld_6</i>						D	E	E				
<i>ld_7</i>												

1114 1150 1122 1124

FIG. 11B

<i>Instruction</i>	<i>Instruction</i>
<i>vliw_1</i>	<i>setir ra, PCR</i>
<i>vliw_2</i>	<i>inst 2</i>
<i>vliw_3</i>	<i>inst 3</i>
<i>vliw_4</i>	<i>inst 4</i>
<i>vliw_5</i>	<i>inst 5</i>
<i>vliw_6</i>	<i>inst 6</i>
<i>vliw_7</i>	<i>inst 7</i>
<i>vliw_8</i>	<i>inst 8</i>
<i>vliw_9</i>	<i>setir rb, PSR</i>
<i>vliw_10</i>	<i>inst 10</i>
<i>vliw_11</i>	<i>inst 11</i>

FIG. 12A

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		1212					1222						
<i>cycle</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>setir</i>	<i>T</i>	<i>WB</i>											
<i>inst7</i>		<i>D</i>	<i>D</i>	<i>E</i>	<i>A1</i>	<i>A2</i>	<i>A3</i>	<i>T</i>	<i>WB</i>				
<i>inst8</i>				<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>E</i>	<i>A1</i>	<i>A2</i>
<i>setir</i>											<i>D</i>	<i>D</i>	<i>D</i>
<i>iST</i>		<i>ST</i>		<i>ST</i>	<i>ST</i>	<i>ST</i>	<i>ST</i>	<i>ST</i>	<i>ST</i>		<i>ST</i>	<i>ST</i>	<i>ST</i>

										1254			
<i>cycle</i>	14	15	16	17	18	19	20	21	22	23	24	25	26
<i>inst8</i>	<i>A3</i>	<i>T</i>	<i>WB</i>										
<i>setir</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>E</i>	<i>A1</i>	<i>A2</i>	<i>A3</i>	<i>T</i>	<i>WB</i>			
<i>inst10</i>					<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>E</i>	<i>A1</i>	<i>A2</i>
<i>inst11</i>											<i>D</i>	<i>E</i>	<i>A1</i>
<i>ST</i>	<i>ST</i>	<i>ST</i>	<i>ST</i>		<i>ST</i>	<i>ST</i>	<i>ST</i>	<i>ST</i>	<i>ST</i>				

FIG. 12B

1300

<i>Instruction</i>	<i>Unit</i>	<i>rd [6:5]</i>
<i>[0]</i>	<i>all</i>	<i>01</i>
<i>[1]</i>	<i>all</i>	<i>10</i>
<i>[2]</i>	<i>gfu</i>	<i>11</i>
<i>[3]</i>	<i>mfu1</i>	<i>11</i>
<i>[4]</i>	<i>mfu2</i>	<i>11</i>
<i>[5]</i>	<i>mfu3</i>	<i>11</i>

FIG. 13

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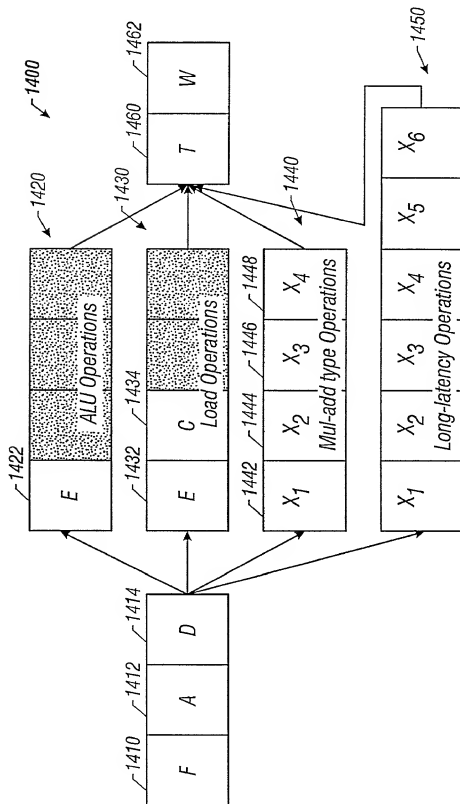


FIG. 14